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ABSTRACT

Initial difficulties in the process of teaching 6 first-grade teachers to use reciprocal teaching in their classes, and the disappointing outcomes of the instruction, led researchers to several conclusions. Researchers realized that the beliefs teachers held about the nature of knowledge and the process of knowledge acquisition had a powerful role in determining the design and outcome of collaborative learning arrangements in class. It is argued that unless researchers attend to such beliefs and the educational practices that are shaped by them, they will be stymied in their attempts to implement findings regarding the benefits of collaborative learning in class. A second attempt to implement reciprocal teaching in the classes of a subset of the teachers resulted in outcomes that were in line with the positive outcomes of a pilot study. In this attempt, researchers took care to collaborate with teachers. Discussion begins with an exploration of beliefs and practices espoused by advocates of collaborative learning, and their relation to the beliefs that drive normative practice in today's schools. Concluding discussion focuses on three issues: (1) selecting collaborative learning tasks; (2) structuring collaborative interactions among students; and (3) grouping students in collaborative learning arrangements. (RH)

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Collaborating in the Interest of Collaborative Learning

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Introduction

Several years ago the first author approached six first grade teachers in a primary school to solicit their involvement in the investigation of an instructional procedure called reciprocal teaching (Brown & Palincsar, in press; Palincsar & Brown, 1984). Reciprocal teaching is a collaborative learning procedure, designed to improve students' comprehension of text. The procedure features dialogues that are structured with the use of four concrete strategies (questioning, summarizing, predicting, and clarifying). These strategies, derived largely from the cognitive literature investigating the activity of skillful readers, are used to support a discussion concerning the meaning of the text with which the group is working. All members in the group take turns leading the discussion. When the members are not leading the discussion, they are supporting the discussion; offering additional explanations of the content, requesting clarification and helping to resolve misunderstandings. While the teacher is initially pivotal to this dialogue, enabling each student to participate in this collaborative effort through instruction, modeling, and coaching, the teacher's goal is to gradually transfer control of the dialogues to the students. The ultimate goal of the instruction is for the students to internalize the use of the problem-solving strategies practiced in the group context for the purpose of improving their independent comprehension of text. In the case of the first grade students, reciprocal teaching was to be investigated as a means of improving the children's listening comprehension. The members of the group would use the strategies to discuss text that the teachers read aloud.

Before describing reciprocal teaching to the teachers, they were asked to indicate their current instructional goals in the area of listening comprehension. Each teacher independently indicated that the most important outcome of listening comprehension instruction with first graders was to learn to follow a sequence of directions. When the teachers were asked to describe their current program of listening comprehension instruction, their responses were consonant with the outcomes indicated in their response to the preceding question: The children spent time (usually weekly) at learning centers where they listened to commercial tapes that required them to complete worksheets by following a series of discrete directions.

Given this state of affairs, it is understandable that our description of reciprocal teaching as an instructional procedure to enhance listening comprehension, with its emphasis on group interaction to promote understanding of extended text and self-regulation of comprehension activity, was met with a degree of skepticism. In fact, the teachers indicated to the principal that class time had already been allocated for listening instruction; there was a gentleman who would be coming to the school once weekly to teach the children to dance with bamboo sticks. To successfully learn bamboo dancing, the children would have to listen and recall a number of directions sequentially.[1] Despite their reservations the teachers gratiously consented to participate in the research.

We failed to acknowledge the significance of the clash between the outcomes the teachers valued and the means by which those outcomes had been traditionally

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[1] It is worth noting that the majority of standardized achievement measures assess listening comprehension by asking the students to respond to a series of discrete directions as opposed to assessing understanding and recall of extended text.

attained in these classrooms with the means and outcomes represented in reciprocal teaching. Instead, we persisted in the implementation of reciprocal teaching, spending inordinate amounts of time coaching these teachers in the use of learning dialogues. Despite the time invested in these classrooms, the outcomes of instruction were disappointing. In contrast to the pilot work, conducted by volunteer teachers, comfortable with the principles of reciprocal teaching, in which over 85% of the first grade students demonstrated significant improvements on several measures included in the study, only 47% of the children in these groups demonstrated comparable gains (Palincsar, Brown, & David, in preparation).

The moral of this story is the focus of this article: the beliefs teachers hold about the nature of knowledge and about the process of knowledge acquisition have a powerful role to play in determining the design and outcome of collaborative learning arrangements in classrooms. We will suggest that unless we attend to these beliefs and to the educational practices shaped by these beliefs, the enthusiasm for collaborative learning that has welled among the researcher community during the past decade will dissipate quickly because we will be stymied in the attempt to implement the findings regarding the benefits of collaborative learning in classrooms. We begin our exploration of the potential rift between instructional research/development and practice by considering the beliefs and practices held dear by those who advocate for collaborative learning. We will examine these in relationship to the beliefs that drive normative practice in today's schools.[2]

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[2] The research reported in this article has been conducted principally in American schools; however, Cohen (1987) has suggested that many of the observations reported in American schools hold true for European schools as well

Collaboration in knowledge acquisition

Current interest in children learning in groups is fueled, in large measure, by theories regarding the mediating processes by which children learn and the extent to which participation in joint learning activities leads to the acquisition, refinement, and internalization of these processes. Both Piaget and Vygotsky contributed to the theory that conceptual development has an essentially social genesis (Brown & Palincsar, in press). In his early writing, Piaget noted ..."that human intelligence develops in the individual as a function of social interaction is too often disregarded" (Piaget, 1967, pp. 224-225). Peer interactions, according to Piaget, were particularly useful in aiding children to "decenter" their thinking as they entertained the multiple perspectives others might bring to the problem-solving situation. Furthermore, the reflection, questioning and explanation in which one engages in group learning promotes higher levels of understanding.

Vygotsky (1978), the developmental theorist who most emphasized the social nature of individual cognition, maintained that the strategic patterns of reasoning exercised within the individual were a reflection of the strategies that the individual was encouraged to follow earlier as a participant in problem solving with others. According to Vygotsky, development is the gradual internalization and personalization of processes that were experienced in social activity. Pivotal, then, to the theories of Piaget and Vygotsky is some form of internalization; that which is witnessed in social settings becomes harnessed as individual cognition (Brown & Palincsar, in press).

The internalization of the dialogue necessary in mature writing was the focus of an investigation of collaborative composing in a study conducted by Daiute (1986). The fourth and fifth graders in this investigation were paired

in writing teams, principally on the basis of matched ability. The students were provided a set of related facts about six animals and were asked to write stories about each of the six animals that incorporated some of the facts as well as their imagination. Four of the texts were completed collaboratively while four were completed individually (two as pretests and two as posttests).

Daiute included in her outcome measures the written products resulting from the collaborative endeavors as well as from individualistic efforts, which were analyzed for length, linguistic complexity and precision, rhetorical structure, features of style and holistic quality. These analyses indicated that the outcomes of the collaborative efforts exceeded what the children could attain as solitary writers. In addition, she analyzed the cognitive processes in which the children engaged to attain these products through audio-recordings of the collaborative sessions, as well as interviews with the students. Daiute concluded that the co-authors in her investigation did indeed share: creative input, evaluative perspectives, composing strategies, and ideas about good writing, which were internalized by the children and employed in their subsequent independent writing. Similar findings are reported in the investigations of children's collaborative writing by Dyson (1987) as well as Carr and Allan (1987) in their studies of collaborative writing among kindergarten children.

Educators' views of knowledge acquisition

Let us juxtapose the positive outcomes for peer collaboration in writing activity, as determined by the studies reported above, with the current beliefs and practices of classroom teachers regarding collaborative writing activity. Freedman (1987) surveyed 560 teachers of writing. Her results indicated that educators are deeply divided as to the efficacy of small-group approaches to

writing. Those teachers who do incorporate the use of groups in writing instruction, typically use groups for the purpose of having students respond to one another's writing as opposed to having students write collaboratively in the manner examined in the preceding studies.

How can we reconcile these differences between the findings of researchers regarding the benefits of collaborative writing and the practices of classroom teachers? Certainly one way is to determine the manner in which teachers' beliefs regarding composition will influence the likelihood that his or her classroom becomes a "community of writers." Research conducted by Raphael, Englert and Anderson (1987) provides provocative evidence in this regard.

Raphael et al. examined teachers' beliefs with respect to writing and writing instruction. We discuss their findings regarding one set of teachers involved in their instructional research. In response to a question concerning the goals of her writing program, one teacher (Teacher A) consistently indicated the belief that the writing process depends upon the writer's imagination, experiences and creativity as well as his or her ability to organize information and engage in reflective thinking. In evaluating students' writing, this teacher indicated that the mechanics were subordinate to the processes of communication. In contrast, a second teacher (Teacher B) reflected the belief that writing can be equated with mechanics, specifically, editing and proofreading for proper use of grammar, punctuation, and spelling.

The beliefs revealed by these teachers in the interviews were evidenced in the writing instruction they provided. Teacher A modeled such processes as selecting a topic, brainstorming information regarding the topic, and getting information from other sources; processes that could be readily adopted by the children in their collaborative and independent writing efforts. Teacher B, in

contrast, led a didactic lesson with little emphasis on the thinking processes that underlie topic selection and evaluation.

It would certainly be folly not to attend to these significant differences in the process of introducing collaborative writing in these respective classrooms. In Teacher B's classroom, the process of writing is commensurate with editing. This teacher would most likely be comfortable using students as editors in peer-response groups. In Teacher A's class, there was a premium placed upon the processes in which children engage in writing activity... writing was conceptualized by this teacher as recursive and wholistic, relying on intuition as well as reason (cf. Hairston, 1982). These are all characteristics that complement well the goals and processes of collaborative writing efforts.

Similar examples can be found in reading instruction. Duffy (1977) identified the intricate relationships among teachers' conceptions of reading and their instructional practices. To illustrate, teachers who were content-oriented in their conception of reading instruction conducted activities typically associated with basal text instruction, including guided reading of basal stories and the instruction of related skills. Teachers who were student-oriented in their conception of reading instruction also engaged in basal reading instruction but also devoted significant time to the affective and oral language dimensions of reading. In our own work, we have seen the relationship between conceptions and practice played out a number of times. Most commonly, we have observed that teachers who conceptualize reading as the mastery of a sequence of isolated skills require considerable support in reciprocal teaching dialogues. Their initial inclination is to subvert the dialogue to practice with the four strategies. In these dialogues, the strategies are not practiced in a manner that communicates to the children their flexible and opportunistic use; rather

the strategies are practiced in a routine fashion. Interestingly, the children in these instructional groups often display gains on measures of strategy use but not concomitant gains on comprehension measures (Palincsar, 1986). As Anderson (in press) has suggested, when teachers do not readily identify with the outcomes and means of instructional programs, and yet are asked to implement these programs, it is most natural that they would adapt the program to accommodate the more familiar outcomes and means.

Thus far, we have suggested ways in which teachers' conceptions regarding the nature of knowledge and specific subject matter can influence the context established for collaborative learning in classrooms. We will proceed to consider the implications of teachers' beliefs and implicit theories regarding the acquisition of knowledge for collaborative learning arrangements.

Teachers' and learners' roles in knowledge acquisition

The conceptualization, propelling contemporary research in collaborative learning, that thought processes actually originate in social interaction conjures a picture of classrooms in which there is shared responsibility for teaching and learning. The teacher models cognitive activity for the purpose of rendering thinking processes overt, explicit, and concrete - remaining mindful of opportunities for the students to engage in cognitive activity and frequently interacting with students to monitor their performance and transfer responsibility for thinking activities to the students as they indicate that they can take charge of their own learning.

This picture represents a striking contrast to the profile of instructional activity in American classrooms today. The observational studies conducted by Peterson and Fennema (1985) in mathematics classes, Anderson, Evertson and

Brophy (1979) in reading classes, and Goodlad (1983) portray classrooms in which each student works alone, seldom interacting with the teacher or with peers. The instruction, directed almost exclusively by the teacher, is focused on lower-level skills while the cognitive activity of both the teacher and students remains a private affair.

Speculating on the reasons for this contrast between a sociohistorical view of teaching and learning and current practice, one might consider the influence that the direct-instruction paradigm has had on American educators. Direct instruction emphasizes teacher structuring of new information and practice in the form of recitation and drill. One could also acknowledge the warranted concerns that teachers indicate regarding classroom management (Cohen, Intilli & Robbins, 1979). One might also consider educators' conceptions of knowledge acquisition. To what extent is the socio-historical perspective on learning one that is shared by educators? To explore this issue we recently conducted interviews with 25 teachers in grades one through three and junior high school. We asked the teachers a series of questions regarding the kinds of learning goals and activities that lend themselves to children learning from one another.

This preliminary work revealed that teachers' agenda for peer group learning differ significantly from the agenda of researchers and theorists. On the one hand, these teachers were very optimistic about the value of peers learning from one another, noting particularly: (1) the active involvement of children in group learning; (2) the opportunities provided to build confidence; (3) the opportunities to attain peer approval; and, (4) to practice social skills. In a number of instances, the teachers commented on the increasing diversity in their classrooms, noting that small group learning was no longer an alternative but was fast becoming a necessity in classrooms. On the other hand, these teachers

seldom mentioned the academic or cognitive gains to be derived from learning in groups. When probed with open-ended questions regarding this issue, the teachers responses were disparate, although the majority of teachers indicated that group learning was best applied to drill and practice. When asked whether there were kinds of learning goals or activities that did not seem best achieved by having children work with one another, there was consensus that new skills and new information should be taught by the teacher and then practiced or applied by the students. In other words, the co-construction of knowledge about which we speak glibly in the collaborative learning literature is a concept rather foreign to the teachers we interviewed. This was particularly true among the first grade teachers who questioned whether such young children had sufficient knowledge that there was indeed something they could learn from one another.

The views indicated by the teachers in these interviews reflect what D. Cohen (1987) has referred to as "ancient instructional inheritance" (p. 15). This inheritance reflects that while teachers are active, learners are passive; and while teachers are the tellers of truth, learners are the accumulators of a knowledge that is objective and stable.

How do teachers' expectations, as indicated in responses to questions such as those presented above, play themselves out in instruction? To examine this issue we will contrast the responses to one question and the instructional practices of two teachers involved in the investigations of reciprocal teaching. The interviewees were asked whether some learning outcomes were best achieved by students learning from one another rather than from a teacher. The first teacher (a first grade teacher) indicated that there were certain types of learning that could occur only among children, citing seven examples including interpersonal problem solving and certain language skills. The second teacher

(a second grade teacher) responded, "If there is a strong teacher, I can imagine nothing that would not be better learned from the teacher." While these teachers' instructional activities could be contrasted on a number of dimensions, the one we will focus on is the teachers' ability and willingness to cede control of the dialogues in reciprocal teaching to the students.

The turn-taking patterns in the dialogues were strikingly different. From the first day of instruction, Teacher A provided opportunities for the children to contribute to the dialogue. By the end of the first ten days of instruction there were twice the number of opportunities for students to contribute to the dialogue in the first teacher's class than in the second teacher's class. Furthermore, while the ratio of student-to-teacher exchanges increased dramatically in the first group, the ratio remained static for the second group.

It is unlikely that these instructional differences were due to group ability differences (e.g., the first graders were more capable of engaging in dialogic instruction); since standardized, grade-appropriate achievement measures of listening and reading comprehension, as well as criterion-referenced measures of the children's knowledge of the strategies used in the dialogues indicated that, if anything, the second graders appeared more prepared to engage in the dialogues. Rather, the contrasts in the engagement of the students in the dialogues appear more reflective of the values, conceptions, and implicit theories of the two teachers orchestrating the collaborative learning dialogues. It is worth noting that, despite the pretest scores, suggesting that the second graders were more ready for the reciprocal teaching dialogues, the gains made by the first grade students exceeded those made by the second graders. The positive relationship between student engagement in the dialogues and gains indicated by

the students has been documented previously (Palincsar, 1986; Palincsar & Brown, in press).

Similar observations relating the beliefs and practices of classroom teachers regarding peer learning were reported by Bussis, Chittendon, & Amarel (1976). Interviews, conducted with 60 teachers, focused on teacher beliefs regarding children as resources for instruction. Bussis et al. found considerable variability among the teachers' responses, ranging from teachers who viewed children as primary resources for instruction to teachers who reported that children have deficits in their knowledge that should be remedied by teachers. The variability in teachers' theories of children's knowledge and the role of children in learning played itself out in the teachers' instructional practices; teachers who regarded children as sources of knowledge engaged in more inquiry teaching and dialogue with their classes.

In summary, there is an array of agendas present in our educational system as well as an individualistic bias that places a premium on the efforts and outcomes of individual students (Sampson, 1981). These factors, as well as the variability in teachers' beliefs and implicit theories regarding the acquisition and demonstration of knowledge, influence the role collaborative learning might play in classrooms. To enhance the probability that collaborative learning endeavors receive a "fair trial" in classrooms, it is essential that researchers and teachers collaborate in implementation efforts.

Collaborating with classroom teachers in the implementation of collaborative learning.

Returning to the story of "how reciprocal teaching almost lost out to bamboo dancing," the succeeding year we were able to involve a subset of the teachers

from this school in another replication of the reciprocal teaching study. Actually, it was not a replication. We took great care to evaluate with the teachers the place that reciprocal teaching had in their curriculum. We spent more time identifying the purposes of reciprocal teaching and describing the mechanisms by which the children would learn comprehension activities. We listened more carefully to the teachers' advice about which students they thought the instruction would benefit most. In essence, the research was conducted in a collaborative spirit and resulted in outcomes that were more comparable to those achieved in the pilot work.

Collaboration is a prominent theme in the current school improvement literature:

> "Discussion of new instructional strategies or new texts or new curricular efforts must be mated with discussions of how best to engage teachers in dialogue about their own teaching, how to find ways for teachers to have a greater sense of their own professionalism, their own sense of excitement as teachers. This can come only through strategies that involve teachers in experiences where they can work together as colleagues, where they can be involved in the plans, and where their concerns can be made primary" (Lieberman & Miller, 1986, p.101).

In the conclusion of this manuscript, we discuss the potential substance of this dialogue with teachers: what are the issues, germane to collaborative learning, that represent the concerns of teachers? We will limit our discussion to three issues: selecting collaborative learning tasks, structuring collaborative interactions among students, and grouping students in collaborative learning arrangements. We raise these particular issues in the belief that: they are pivotal to the success of collaborative learning efforts, they are issues with which we are still grappling, and teachers have significant knowledge to bring to these issues.

Selecting collaborative learning tasks. Task characteristics are an important dimension to consider in establishing the context for peer collaboration (cf. Rogoff, 1984). The extent to which children can engage in collaborative problem solving is, in part, a reflection of the extent to which the task represents a problem worth collaboration. Willems (1981) suggests that problems can be conceptualized along a continuum, ranging from those for which the data are clearly specified and the solution is obvious to those for which the learner must select the relevant information and for which there are various solutions. The more "open" the problem type, the greater the opportunities for collaboration. The literature on small group learning is often silent with regard to the nature of the problem with which students were interacting. Furthermore, what description is provided, suggests that the problems are typically toward the "closed" end of the continuum, limiting the opportunity for collaboration. While this poses a certain dilemma, it is also the case (as we have argued earlier in this manuscript) that classroom problems, as typified by workbook and worksheet activities, are also toward the "closed" end of the continuum. Furthermore, as the interview results reported earlier indicate, closed problems may well constitute the context with which many teachers are most comfortable implementing group learning arrangements.

Hence, task selection is a useful place to begin dialogues with teachers. The current call for renewed emphasis on the teaching of thinking skills suggests that the door may be opened to entertaining a wider array of tasks for collaborative learning in classrooms. Concurrently, researchers must attend more seriously to the thinking processes that are practiced in group contexts and the types of improvements in critical thinking that might be anticipated from collaborative problem solving endeavors. In addition to the task the

context for collaborative learning is further defined by the manner in which interactions among the participant are structured.

Structuring collaborative interactions. One of the interesting and frustrating features of the literature on collaborative learning is how little attention has been paid to the process of structuring the interactions among the learners. In contrast to the peer tutoring literature, where extensive attention has been paid to instructional features such as: eliciting responses from tutees, providing feedback, and error correction procedures (cf. Maheady, Harper, & Sacca, in press) our review of the literature on cooperative and collaborative learning indicates little attention to these issues. In fact, it is not uncommon to read little more than a passing reference to the task, much less an explication of if, and how, the students were prepared to interact with one another in the completion of the task.

This is unfortunate for a number of reasons. First, research such as that conducted by Webb (this volume, 1982) and Peterson, Janicki, & Swing (1981) indicates that there are intricate relationships among the nature and outcomes of peer interactions. For example, the benefits of receiving help from a peer are a function of the behavior that elicited the help and the nature of the help received. Furthermore, research suggests that children are not natural collaborators. For example, Forman's (1981) analysis of procedural interactions among fourth and fifth graders, indicated that the majority of interactions between the pairs of children solving a problem that required the students to mix a series of chemicals to attain specified colours were classified as either parallel or associative, with little evidence of cooperative interactions (defined as those in which the children monitor each other's work and play coordinated

roles in performing task procedures). Indeed, we have observed in our own work that children, as young as six, already reflect the competitive vs. collaborative norm which prevails in our schools. We are reminded of a group of first graders who were asked to summarize the story they were working on for a child who was absent the previous day. After a few minutes of summary, the child who had been absent began to join in the discussion, making predictions as to what would occur next in the story. One of his peers protested to the group, "Stop! We are giving him too much help!" Hence, it seems unlikely that the interactions for which peer collaboration is valued will occur without thoughtful attention to fostering these interactions.

Research in peer collaboration, particularly with regard to the kinds of interaction that are most effective at inducing maximal cognitive growth is, in many respects, in an emergent state. Consequently, this issue does indeed provide rich opportunities for collaborative problem-solving among teachers and researchers. What are teachers' views on this subject? In our interview, we asked the question, "How would you advise that teachers, who are interested in having children learn from one another, structure these opportunities?" Of the twenty-five respondents, eleven of the respondents had been involved in investigations of reciprocal teaching. The remaining teachers were selected from the same schools and grade levels. In addition, they were matched for years of teaching experience. There were important distinctions among the responses of the teachers who had this involvement and the teachers who had not experienced a particular form of collaborative learning. The reciprocal teaching faculty most frequently identified the need to model the form of interaction with the students. They emphasized the need for all members of the group to understand the specific goal of the interaction. They described the interaction as a

series of stages or steps and suggested that students needed to be provided a "blueprint" for interaction. Finally, the teachers suggested that it was useful if the children had the language to label what it was they were doing in the interaction. These responses are particularly interesting vis a' vis the responses of teachers who had not been engaged in a systematic manner in any form of collaborative learning. These teachers most frequently commented on the need to provide the students adequate space in which to work as a group and secondly, to explain clearly the directions for completing the designated task.

The comments of the teachers involved in reciprocal teaching support the role of the strategies in providing the "language of the interaction" in reciprocal teaching dialogues. The strategies used to structure the dialogues are, in essence, the "blueprint" of the interaction. In addition, the teachers noted that the designated role of "discussion leader" in which every child participated made the purpose and direction of the instruction explicit to themselves as well as the students. The receptivity of the teachers to a "plan" for interaction suggests that there would be interest on the part of teachers to arrangements such as the Jigsaw Classroom (Aronson, 1978) and Learning Leader, Learning Listener arrangements (Spurlin, Dansereau, Larson, & Brooks, 1984). The extent to which learner interactions are structured and the nature of these interactions will reflect the nature of task as well as the membership of the group.

Grouping children for the purpose of collaborative learning. Collaborative learning researchers typically make grouping decisions based upon variables such as the ability, and racial/cultural or sociometric status of the participants. While the teachers we interviewed acknowledged the role of ability, they indicated that there is a complex set of issues that should be considered in making decisions

about grouping children for collaborative learning experiences. For example, the teachers were unanimous in identifying "personality differences," differences in work habits and differences in the rates at which children work. Furthermore, teachers identified the desirability of maintaining flexible groups. A number of teachers suggested, for example, that while initial groupings might place higher- with lower-abilitied students, it would be appropriate, over time, to reevaluate this arrangement since lower-abilitied children will often not assume leadership in groups unless they are placed with lower-abilitied children and higher-abilitied children may not be appropriately challenged unless they are placed with other children of comparable ability. Finally, teachers observed that sometimes lower-abilitied children are not, in fact, so low in the group context. In support of this observation, several teachers noted, that while lower-abilitied children may not have the "technical" writing skills, they may have sound ideas to contribute to the group which could be recorded by others. The responses of this small set of teachers suggest that there is a host of factors to which researchers might attend when collaborating with teachers regarding group membership decisions.

Conclusion

To the extent that they define the context in which collaboration occurs, teachers have a critical role to play in the orchestration of collaborative learning arrangements. The quality and outcome of collaborative learning endeavors are reflections of the success with which teachers mediate these efforts via: the selection of problems, the preparation of students to participate as collaborators, the formation of learning groups, and the outcomes teachers choose to assess. Underlying teachers' decisions regarding this context are

implicit theories and beliefs regarding the nature of knowledge and knowledge acquisition. Constraining teachers' decisions are organizational factors and tradition. Enhancing their decision making is the wisdom gleaned from their experiences. Through collaboration with teachers, the synergy we claim for collaborative problem solving among children can be ours to enjoy as well.

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